



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**01.06.2005 Bulletin 2005/22**

(51) Int Cl.7: **A63F 13/10**, G06F 3/00,  
**A63F 13/00**, **A63F 13/08**,  
**A63F 13/12**

(43) Date of publication A2:  
**20.12.2000 Bulletin 2000/51**

(21) Application number: **00103876.9**

(22) Date of filing: **24.02.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE**  
 Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventors:  
 • **Ohshima, Toshikazu, c/o Mixed Reality Systems**  
**Nishi-ku, Yokohama-shi, Kanagawa-ken (JP)**  
 • **Sato, Kiyohide, c/o Mixed Reality Systems**  
**Nishi-ku, Yokohama-shi, Kanagawa-ken (JP)**

(30) Priority: **11.06.1999 JP 16471899**  
**11.06.1999 JP 16471999**  
**11.06.1999 JP 16570999**

(74) Representative:  
**Pellmann, Hans-Bernd, Dipl.-Ing. et al**  
**Patentanwaltsbüro**  
**Tiedtke-Bühling-Kinne & Partner**  
**Bavarlaring 4-6**  
**80336 München (DE)**

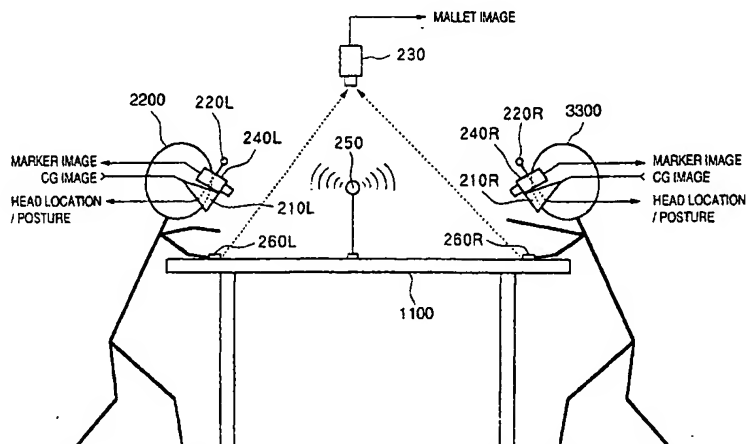
(71) Applicant: **CANON KABUSHIKI KAISHA**  
**Tokyo (JP)**

(54) **Apparatus and method to represent mixed reality space shared by plural operators, game apparatus using mixed reality apparatus and interface method thereof**

(57) This invention provides a mixed reality apparatus and mixed reality presentation method, which can present reality even when a plurality of players share a common mixed reality space. Virtual objects (41 - 47) are superposed to hide devices such as an HMD and the like that another player wears. In addition, there is disclosed a user interface apparatus to which the user (player) can easily sensuously become accustomed, and which can accurately recognize instructions (com-

mands) that the user (player) intended. The user interface apparatus has a location/posture sensor (150) attached to the head of the user, and a location/posture sensor (151) attached to his or her hand, analyzes hand action on the basis of the relative position of the location/posture of the hand with respect to those of the head, and estimates the current action state from the analysis result. The apparatus then determines a user instruction (player command) on the basis of the action state.

**FIG. 15**





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 00 10 3876

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |   |  |
|---|---|---|--|
| Category  | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim                                   | CLASSIFICATION OF THE APPLICATION (Int.Cl.7)                 |
| X   | EP 0 899 690 A (MIXED REALITY SYSTEMS LAB INC) 3 March 1999 (1999-03-03)<br>* abstract *<br>* paragraphs [0039] - [0042], [0069], [0090], [0168], [0175]; claims 1,17; figures 1-3 *<br>* page 5, line 24 - line 25; claim 10 *<br>* page 6, line 5 - line 17; claim 12 *   | 1-30,<br>32-40                                      | A63F13/10<br>G06F3/00<br>A63F13/00<br>A63F13/08<br>A63F13/12 |
| X   | US 5 558 619 A (NAKAMURA MASAKAZU ET AL) 24 September 1996 (1996-09-24)<br>* abstract *<br>* column 5, line 51 - line 67 *  | 1   |  |
| X   | PATENT ABSTRACTS OF JAPAN<br>vol. 0182, no. 76 (C-1204),<br>26 May 1994 (1994-05-26)<br>-& JP 06 047170 A (SEGA ENTERP LTD),<br>22 February 1994 (1994-02-22)<br>* abstract *   | 1   |  |
| X   | OHSHIMA T ET AL: "AR<2>Hockey: a case study of collaborative augmented reality" VIRTUAL REALITY ANNUAL INTERNATIONAL SYMPOSIUM, 1998. PROCEEDINGS., IEEE 1998 ATLANTA, GA, USA 14-18 MARCH 1998, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 14 March 1998 (1998-03-14), pages 268-275, XP010268738<br>ISBN: 0-8186-8362-7<br>* the whole document * | 1   | TECHNICAL FIELDS<br>SEARCHED (Int.Cl.7)<br>G06F<br>A63F      |
| A   | US 5 703 604 A (MCCUTCHEN ET AL) 30 December 1997 (1997-12-30)<br>* abstract *<br>* column 8, line 59 - column 9, line 11 *   | 21-30,<br>32-40                                     |  |
| -The present search report has been drawn up for all claims   |   |   |  |
| Place of search<br>Munich   |   | Date of completion of the search<br>7 February 2005 | Examiner<br>Garton, P  |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family; corresponding document</p> |   |   |  |

5  
EPO FORM 1503 02.82 (P04C01)



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 00 10 3876

| DOCUMENTS CONSIDERED TO BE RELEVANT  |  |  |  |
|--|--|--|--|
| Category   | Citation of document with indication, where appropriate, of relevant passages  | Relevant to claim  | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| A  | US 5 694 142 A (DUMOULIN ET AL)<br>2 December 1997 (1997-12-02)<br>* abstract *<br>* claims 1-8 *  | 21-30,<br>32-40  |  |
| A  | STATE A ET AL: "SUPERIOR AUGMENTED REALITY REGISTRATION BY INTEGRATING LANDMARK TRACKING AND MAGNETIC TRACKING" COMPUTER GRAPHICS PROCEEDINGS 1996 (SIGGRAPH). NEW ORLEANS, AUG. 4 - 9, 1996, COMPUTER GRAPHICS PROCEEDINGS (SIGGRAPH), NEW YORK, NY : ACM, US, 4 August 1996 (1996-08-04), pages 429-438, XP000682759<br>* the whole document * | 1-20   |  |
| A  | "FORE-SCREEN DISPLAY AND MANIPULATION FOR VIRTUAL WORLD INTERACTION" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 36, no. 3, 1 March 1993 (1993-03-01), pages 45-46, XP000354695<br>ISSN: 0018-8689<br>* the whole document *   | 1-20   |  |
| <div style="text-align: center;">-----</div> <p><del>The present search report has been drawn up for all claims</del></p>  |  |  |  |
| Place of search<br><b>Munich</b>   |  | Date of completion of the search<br><b>7 February 2005</b> | Examiner<br><b>Garton, P</b>                 |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |  |  |  |

5  
EPO FORM 1503 03.82 (P04C01)



European Patent  
Office

Application Number

EP 00 10 3876

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- 1-20, 21-44
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent  
Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
EP 00 10 3876

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-20

Relates to basic MR device, which solves the problem of mixing CG and real images in HMD and determining the correct rotation/translation/scaling of overlaid CG images in relation to the viewing direction/axis of a user in the MR environment.

---

2. claims: 21-44

Relates to a pointing device used in MR space, which enables other users apart from self to be able to easily see what/where is being pointed at using a set of parallel lines emitting from the users hand to the object being pointed at. Solves the problem in MR that it is hard to see what another user in the environment is pointing at when CG and real images are mixed (i.e. showing a 3D environment on a 2D screen). Also allows to judge distances to objects using scale marks at predetermined intervals.

---

3. claims: 45-85,86-102

Relates to a user interface/game in the MR environment using the sensor to detect a certain action performed by the player in the game. Two sensors are used, one in HMD, one in hand. Problem solved is effective detection of which action player wishes to perform using the two sensors, whilst trying to avoid detecting the wrong action.

---

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 10 3876

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-02-2005

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---|---------------------|----------------------------|---------------------|
| EP 0899690                                | A | 03-03-1999          | JP 3486536 B2              | 13-01-2004          |
|   |   |                     | JP 11088913 A              | 30-03-1999          |
|   |   |                     | JP 3450704 B2              | 29-09-2003          |
|   |   |                     | JP 11136706 A              | 21-05-1999          |
|   |   |                     | EP 0899690 A2              | 03-03-1999          |
|   |   |                     | JP 2003308514 A            | 31-10-2003          |
|   |   |                     | US 2002084974 A1           | 04-07-2002          |
| -----                                     |   |                     |                            |                     |
| US 5558619                                | A | 24-09-1996          | JP 3065702 B2              | 17-07-2000          |
|   |   |                     | JP 5031068 A               | 09-02-1993          |
|   |   |                     | DE 4213418 A1              | 29-10-1992          |
| -----                                     |   |                     |                            |                     |
| JP 06047170                               | A | 22-02-1994          | JP 2550832 B2              | 06-11-1996          |
| -----                                     |   |                     |                            |                     |
| US 5703604                                | A | 30-12-1997          | NONE                       |                     |
| -----                                     |   |                     |                            |                     |
| US 5694142                                | A | 02-12-1997          | DE 19542604 A1             | 23-05-1996          |
|   |   |                     | JP 8279059 A               | 22-10-1996          |
|   |   |                     | EP 0629963 A2              | 21-12-1994          |
|   |   |                     | IL 109939 A                | 30-09-1997          |
|   |   |                     | JP 7136175 A               | 30-05-1995          |
|   |   |                     | US 5526812 A               | 18-06-1996          |
| -----                                     |   |                     |                            |                     |